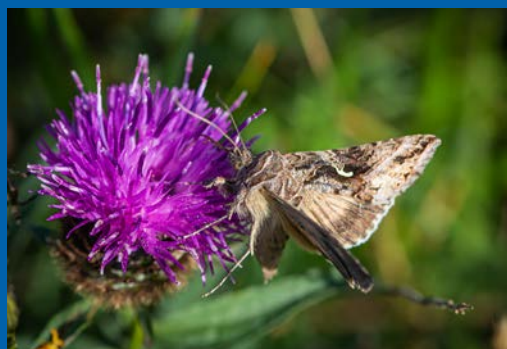




Biodiversity Toolkit

for Housing Providers

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About the Biodiversity Toolkit

This Biodiversity Toolkit aims to help Housing Providers manage their sites for wildlife

Introduction

Urban green spaces are important places for wildlife in the UK, but many are not as good as they could be. This **Biodiversity Toolkit** provides information on how you can improve, maintain and monitor green spaces around your site(s) for wildlife.

Early engagement with staff and residents is key to success. Co-designing green space is a great way to bring together wildlife enthusiasts within your Estate Care and Environment teams and residents, and help bring a sense of ownership to all involved in the project.

First ask your teams to review all the 26 biodiversity management options (there is a useful summary table of these options on page 6). Then choose which of the options (starting on page 7) as a team, you want to implement on site. There is space next to each option for making notes. We recommend you print off an estate map and secure this in the front of the binder to help you plan where on site to add your chosen options.

These biodiversity management options have been drawn from a wide range of sources. While this is not an exhaustive list of all possible options, it covers a range of relatively low-cost, easy to implement management options proven to increase biodiversity. Best practice is to arrange a survey of the wildlife on your site, before any work starts (your local

Wildlife Trust (LWT) may be able to advise on this). This would give you a good idea of what wildlife you already have on site and can help you decide what options to choose and where they will have the most benefit: you may already have good areas for wildlife that only need a slight change in management. This baseline survey would also help you to monitor the changes you are implementing.

Local Environmental Records Centres (LERCs) and LWTs can help advise on locally important species on your site and in your area. Along with local councils (e.g. county, district, town and parish councils), they can also provide details about other local wildlife projects and how you might be able to link in with these, which will make what you do even more beneficial for wildlife.

The biodiversity enhancing options are broken down into the following six themes:



Plants: grassland and flowers



Plants: trees and shrubs



Pollinators and other invertebrates



Birds and mammals



General biodiversity



Sustainability



The notes for each option cover:

- Housing density and suitability
- Benefits
- Costs
- Methods
- Maintenance
- Monitoring success

Many of these options have benefits for a wide range of wildlife and are placed within the themes based on where most evidence of benefits has been documented, and to make the options easier to use.

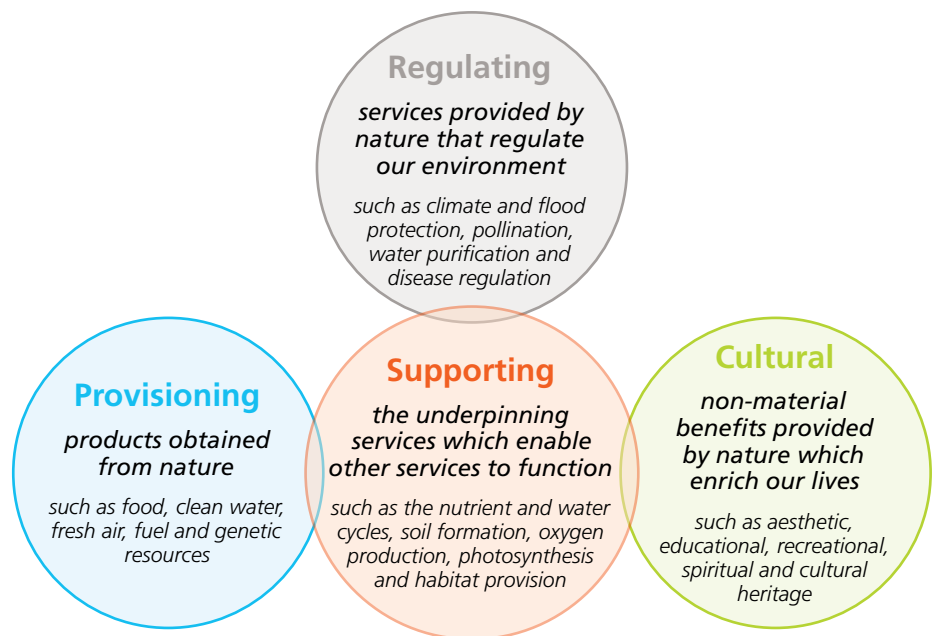
Within each option the benefits to other wildlife are also described. For example, Option 1 (Reduced mowing) is placed within the theme **Plants: grassland and flowers**. But reducing mowing and creating a wildflower meadow will have much wider benefits to invertebrates and the birds, mammals, reptiles and amphibians that feed on them and make homes in the longer vegetation.

What is biodiversity and why is it important?

Biodiversity is the variety of life on Earth, in all its forms and all its interactions. This includes everything from microorganisms, plants and animals to the natural systems that support them. Biodiversity describes our natural wealth, which makes up the living landscape around us, sustains ecological systems and enhances our quality of life.

Ecosystem services

Biodiversity enables our natural systems to function properly by providing many important services such as soil formation and nutrient recycling, and pollution breakdown and absorption, as well as biological resources such as the water we drink, the air we breathe and the food we eat.



In short, human survival is dependent upon these vital 'ecosystem services'. Ecosystem services can be defined as the benefits that people derive from nature. The Millennium Ecosystem Assessment¹ categorised these as: provisioning, regulating, supporting and cultural services.

A really good example of how nature provides valuable ecosystem services to humans is by showing the importance of trees in towns and cities².

Regulating

Trees cool the surrounding environment through shading and evapotranspiration, a process where trees take up water from the ground and release it through

the surfaces of their leaves, cooling the surrounding air. This helps to reduce the heat island effect in urban areas (built-up areas with temperatures higher than surrounding rural areas).

Trees also play an important role in combatting climate change by capturing and storing carbon from the atmosphere.

The roots of trees help improve soil quality through protection from erosion and aeration.

They also increase infiltration of rainwater into the soil, reducing runoff from floods.

Provisioning

The leaves of trees improve urban air quality by removing harmful pollutants and filtering dust from the air whilst also providing a barrier to noise. They provide nesting, shelter and food for local wildlife such as birds and invertebrates.

Cultural

The presence of trees in urban areas provides people in towns and cities with daily access to nature on their doorstep, helping to relieve stress, improve emotional well-being and strengthen their connections to nature³.



Biodiversity and well-being

What is well-being?

Human well-being is a very broad and complex concept and can mean different things to different people. Well-being includes both subjective (e.g. how happy you feel on a scale of 1-5) and objective measures (e.g. access to resources). A simple definition from the Oxford English dictionary describes well-being as

'The state of being comfortable, healthy, or happy'

The World Health Organization (WHO) describes human health⁴ as

'A state of complete physical, mental and social well-being and not merely the absence of disease or infirmity'

A more complex assessment takes into account the numerous aspects of health as well as the environment in which humans live; for example, the Millennium Ecosystem Assessment¹ identifies five basic elements of human well-being as:

- an adequate supply of basic materials for livelihood (like food, shelter, clothing, energy)
- physical health
- security
- good social relations
- personal freedoms

This approach outlines the interdependence between human health and well-being and a healthy and stable ecosystem.

Nature, biodiversity and well-being

There is a growing body of evidence demonstrating a connection between engagement with the natural environment and improved well-being⁵. Numerous studies have found that daily contact with nature is connected to better health through reductions in obesity⁶, stress levels⁷ and improved concentration⁸.

Although the effects of 'green space' are increasingly well understood, little is known about the importance of variation in the quality of green space, in particular differences in biodiversity, for benefits to human well-being.

Two hours a week

A recent study found that significant health improvements can be gained from just two hours of exposure to nature a week⁹. This effect was the same for people regardless of age, income and whether the person lived in urban or rural areas. It did not matter whether the two hours were taken in one go or in a series of shorter visits.

A study in northern England showed there is a link between the biodiversity of urban green spaces and their users' well-being¹⁰. Participants across 15 urban parks in Sheffield reported increased psychological well-being in the environment with the greater species richness of plants and, to a lesser extent, birds and butterflies.

Psychological well-being measures focused on green space as a source of cognitive restoration, positive emotional bonds and

sense of identity. Participants were asked whether their visit to the park helped to clear their minds, think about personal matters, gain perspective and connect with nature. They were able to recognise and estimate the level of biodiversity in the park, demonstrating that the level of biodiversity is relevant to the public. This indicates that not only do green spaces provide measurable psychological and physical benefits to visitors, but that the biological complexity is significant for visitors' psychological well-being¹¹. So it is not just a matter of quantity (more green spaces and better access to them), but also the quality of green spaces that are provided.

This biodiversity toolkit aims to help housing providers increase the quality of available green spaces and by doing so, benefiting not only wildlife, but the physical and mental well-being of residents too.

¹ World Health Organization. (2005). *Ecosystems and human well-being: health synthesis: a report of the Millennium Ecosystem Assessment*. Geneva: World Health Organization.

² Davies, H., Doick, K., Handley, P., O'Brien, L. and Wilson, J. (2017) *Delivery of ecosystem services by urban forests*. Forestry Commission Research Report.

³ Johnston, M. and Percival, G. (2012) Trees, People and the Built Environment - Proceedings of the Urban Trees Research Conference, 13-14 April 2011.

⁴ World Health Organization (2020) Basic documents: forty-ninth edition (including amendments adopted up to 31 May 2019). Geneva: Licence: CC BY-NC-SA 3.0 IGO.

⁵ Richardson, M., et al., Days Wild: Development and Evaluation of a Large-Scale Nature Engagement Campaign to Improve Well-Being. *PLoS one*, 11(2): p. e0149777.

⁶ Wolch, J., et al. (2011) Childhood obesity and proximity to urban parks and recreational resources: a longitudinal cohort study. *Health & place*, 17(1): p. 207-214.

⁷ Li, Q., (2010) Effect of forest bathing trips on human immune function. *Environmental health and preventive medicine*, 15(1): p. 9-17.

⁸ Faber Taylor, A. and F.E. Kuo, (2009) Children with attention deficits concentrate better after walk in the park. *Journal of attention disorders*. 12(5): p. 402-409.

⁹ White, M.P., et al., (2019) Spending at least 120 minutes a week in nature is associated with good health and well-being. *Scientific reports*, 9(1): p. 1-11.

¹⁰ Fuller, R.A., Irvine, K.N., Devine-Wright, P., Warren, P.H. and Gaston, K.J., (2007) Psychological benefits of green space increase with biodiversity. *Biology letters*, 3(4), pp.390-394.

¹¹ Taylor, L. and D. F. Hochuli (2015). Creating better cities: how biodiversity and ecosystem functioning enhance urban residents' well-being. *Urban ecosystems*, 18(3): 747-762.

Working together with local organisations and councils

By working with established wildlife groups and your local council, you can benefit from existing conservation, training and community engagement expertise. It may even be possible to pool resources, and work together to link up areas of urban habitat.

Local groups might include natural history and conservation volunteers, as well as special interest groups focusing on particular groups of species like birds, plants and bats.

Local wildlife organisations can also contribute volunteers and practical skills. Local councils (county, district, town and parish) are important stakeholders as they control decisions about how many urban green spaces are managed.

Examples of these organisations are discussed here, but there are many more. We recommend a flexible approach to make the most of those who have time to share with you. See the Southern Housing Group website for more information on the variety of organisations with which housing providers can work with.



Local Environmental Records Centres

Local Environmental Records Centres (LERCs) are organisations that collect, collate and manage wildlife data to support the conservation, understanding and enjoyment of local biodiversity. LERCs provide a 'one-stop-shop' for information on sites, habitats and species in their region. LERCs by region can be found via the Association of Local Environmental Record Centres (ALERC) website at: <http://www.alerc.org.uk/lerc-finder.html>.

The Wildlife Trusts

There is a good opportunity to form links with a local Wildlife Trust who can provide expert help with delivering resident engagement schemes. Wildlife trusts can also provide the expert advice on the specific wildlife-friendly actions. <http://www.wildlifetrusts.org/find-wildlife-trust>.

Local councils

Local authorities in England and Wales have a key role to play in the conservation of biodiversity, recognised in Section 40 of the Natural Environment and Rural Communities (NERC) Act 2006, where:

'Every public body must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity'

One of the ways councils can contribute to delivering this duty is through partnerships with environmental organisations and other local community groups <http://www.gov.uk/find-local-council>.

Involving local residents with projects on site

It's really important to involve local residents from the beginning and throughout the process. Studies have shown that both exposure to nature, and the opportunity to get involved are beneficial.

Getting residents on board at an early stage can also help to overcome any potential objections to the project. Keeping everyone informed will help to create a sense of community ownership over green space, vital for its long-term sustainability.

Different types of engagement are useful to work with residents.

- **Recording wildlife.** One of the simplest ways to get residents involved is to get them to tell you what they have seen around the site and/or to submit records to local and national recording schemes.
- **Information boards.** Use signs to tell residents about wildlife on site, explain the benefits to biodiversity from management

practices or the installation of wildlife features, and address potential concerns. Suppliers include Nature Sign Design.

- **Newsletter / fliers.** Volunteer residents could help to disseminate information through fliers and newsletters.
- **Social media.** Volunteer residents could help to disseminate information through social media.

Local social media groups are a great way of enabling a wide array of people to participate in exploring wildlife, by sharing their pictures and asking questions.

Social media can support community social cohesion, like arranging events and getting people together.

- **Local resident wildlife group.** Engage with resident wildlife group, if one exists, or help support the set up.
- **Monitoring success.** Resident questionnaire surveys, feedback through local residents' wildlife group.

Measuring biodiversity

To assess whether the options you have implemented have been successful, measuring the outcomes is important. It can also be a great way to get Estate Care and Environment teams and residents more involved in the work you are doing and help them to engage more with nature on your site to help improve their well-being.

Here we discuss some simple ways to do this. Some management options can take several years before the full benefits are seen. So monitoring how things change over longer time periods is important.



Recording wildlife

Every record counts and will not only help you get a picture of what wildlife is on your site, but can contribute to recording schemes who use the data to tell how well different plants and animals are doing over time. Not every record needs to be identified to species level and no prior experience is needed: everyone can get involved.

iNaturalist <https://www.inaturalist.org> is a network of naturalists, citizen scientists and biologists. Records of any wildlife (with a photo) can be submitted with a provisional identification to whatever level the recorder feels comfortable. They are then identified by the online community after which they can become part of national and regional recording schemes. This approach not only means residents can start to learn about the wildlife they see, but can also help others learn about the

Examples of information for residents who want to get involved in green activities

Garden Organic

Advice and support for individuals or groups who want to become involved in organic gardening, including local community groups who want help to set up and run organic community gardens <http://www.gardenorganic.org.uk>.

Natural England

Government's adviser for the natural environment, helping protect England's nature and landscapes for people to enjoy and the services they provide.

Social Farms and Gardens

A UK-wide charity that supports communities to farm, garden and grow together. They offer a wealth of information, in-depth knowledge and advice for groups planning to start a community garden, with a comprehensive Resources Section: <http://www.farmgarden.org.uk/resources>.

Community Growing Resource Pack

A comprehensive guide to setting up, developing and sustaining a community-managed farm, garden or related community growing space: <http://www.farmgarden.org.uk/resources/community-growing-resource-pack-england>.

Green Flag: Community Green Space Awards

Social Farms & Gardens are a partner in the Green Flag Awards Scheme, working with Keep Britain Tidy, and its respective organisations in Northern Ireland, Scotland and Wales <http://www.greenflagaward.org.uk>.

The Conservation Volunteers (TCV) Green Gym

TCV created and runs Green Gyms across the UK and offers a number of ways for public sector organisations and local community groups to establish a Green Gym <http://www.tcv.org.uk>. They also have local volunteer groups who do practical tasks and they also publish practical guides on habitat management and sell trees for planting.

wildlife by helping them identify records as they gain experience themselves. General recording is appropriate for helping to monitor the success of the biodiversity management options presented in this toolkit.

There are also more specific recording schemes targeting particular types of wildlife or to submit records where the recorder has more experience and confidence in the identification of what they are recording.

Further details can be found on the Biological Records Centre (BRC) website at: <http://www.brc.ac.uk>. This type of recording is listed as 'General recording' under the 'Monitoring success' section for each biodiversity management option in this toolkit.

Estate Care and Environment teams and residents could also be encouraged to take part in more structured biological recording which help us record wildlife in a standardised way so that we can assess changes to animal and plant populations over time. The schemes provide advice on how to carry out simple and fun surveys and often have free identification tools and mobile apps to submit records of wildlife. They are a great way to monitor changes to wildlife over time on your site and can help to measure the success of any management options put in place.

See the Southern Housing Group website for some of the surveys you can take part in <http://www.shgroup.org.uk/toolkit>.

Biodiversity management options

This table summarises 26 management options to improve biodiversity around your site. We recommend getting a survey of the wildlife on your site (see page 1) and/or consulting your local Wildlife Trust before the work starts to help you select which options and plant species are best for your site. You can also use the RHS website <http://www.rhs.org.uk/advice> to help select plants suitable for your soil type and location.

Quick guide to scales		
Density*	Cost	Level of ongoing maintenance
Low	£10 - £200	Minimal
Medium	£200 - £1000	Annual
High	£1000 +	Regular

Option		Housing density suitability			Cost			Level of ongoing maintenance		
		Low	Med	High	Low	Med	High	Low	Med	High
Plants: grassland and flowers										
1	Reduced mowing	•	•		N/A - cost-saving			•		
2	Addition of Yellow-rattle	•	•		•				•	
3	Wildflower enhancement: plug plants	•	•		•	•			•	
4	Re-seed grassland with meadow mix	•	•		•				•	
Plants: trees and shrubs										
5	Plant native wildlife hedge	•	•	•	•				•	
6	Provide vertical planting	•	•	•	•				•	
7	More flowering shrubs and herbaceous plants	•	•	•	•					•
8	Plant container gardens	•	•	•	•				•	•
9	Plant native trees and shrubs	•	•	•	•			•	•	
Pollinators and other invertebrates										
10	Bug hotels and nest boxes for solitary bees	•	•	•	•				•	
11	Leave or plant ivy as a food resource	•	•	•	•				•	
12	Create natural bee nesting sites	•	•		•			•		
13	Create log piles and a loggery	•	•		•			•		
Birds and mammals										
14	Bird nest boxes	•	•	•	•			•	•	
15	Reduced hedgerow cutting	•	•	•	N/A - cost saving			•		
16	Bat boxes	•	•	•	•			•		
17	Hedgehog houses and highways	•	•	•	•				•	
18	Retain areas of scrub	•	•		•			•	•	
General biodiversity										
19	Create pond habitat	•	•		•	•			•	
20	Reduce input of herbicides/pesticides	•	•	•	•					•
21	Green roofs and living walls	•	•	•			•		•	•
Sustainability										
22	Build/ install compost bins	•	•	•	•					•
23	Create vegetable plots	•	•		•					•
24	Install a water butt	•	•	•	•			•		
25	Create rain gardens	•	•	•	•	•		•		
26	Sustainable lighting	•	•	•	•	•		•		

* Low density (1-100 homes and/or large areas of green space – greater than 1 ha (10 000 m²). Medium density (101-200 homes and/or small-medium areas of green space – between 100 m² and 1 ha (10 000 m²), where at least 100 m² is available as one continuous area). High density (> 200 homes and/or with very limited green space – less than 100 m² and in fragmented patches).

1

PLANTS: GRASSLAND AND FLOWERS

Reduced mowing



Reduce or stop mowing in allocated areas. By leaving areas to grow long, the species that come up will help determine whether further management is required, like plug planting or sowing of Yellow-rattle, to increase floral and structural diversity.

Suitability	Low to medium density housing if sufficient areas of grassland are available. There is no fixed area we can recommend for this option, as it will depend on your site, but anything you can do will benefit wildlife and the more the better – it is good to create a mix of short and long grass if you can.
Management type	Grassland management.
Supplier information	Not applicable.
Community engagement?	Not applicable.
Benefits	- Enables existing wildflowers and grasses to grow, flower and then set seed. This will increase the overall floral diversity of the grassland, and provide more resources for a greater variety of wildlife (such as seed-feeding birds). - A mosaic of vegetation at varying heights increases the diversity of habitat structure. These different 'micro-habitats' and 'micro-climates' support a greater diversity of animals as different species require different conditions. Areas of longer vegetation provide refuge from predators and weather - Reduced management costs.
Costs/Disbenefit	- Financial cost: not applicable – cost-saving potential. - May be a perception of 'untidiness' by residents. Important to clearly communicate to residents the reasons and benefits to wildlife for leaving areas of long grass. - Possible increased risk of hayfever to residents – although there will be an increase in pollen-bearing grass flowers, these will be largely restricted to areas furthest away from buildings.
Level of ongoing maintenance	Low.



1

PLANTS: GRASSLAND AND FLOWERS

Reduced mowing

		Notes
How achieved	Reduce or stop mowing in allocated areas. Leaving areas to grow long and see what species come up will help determine whether further management is required (e.g. plug planting, sowing of Yellow-rattle) to increase floral and structural diversity.	
Timing of activity	Mow grass mid-late July in first year. Then mow again late September-October.	
Long-term management	Recommend 2-3 mows per year maximum: year 1 mow in March (spring cut), mid-late July (summer cut) and late September to October (autumn cut). Mow the edges of paths more regularly than the rest to help show residents that this is a deliberate activity. Try not to mow all areas at the same time. Leave a few patches of longer vegetation over winter. Where possible, leave the cuttings in place for 1-3 days to give any sheltering wildlife a chance to move away. Don't leave the cuttings for longer than this time as this can increase soil fertility and reduce the diversity of plants that can grow. Where possible cuttings could be moved elsewhere on site, as they can provide food and shelter for other wildlife. Some plant materials such as hollow plant stems can be used in bug hotels and bee nests.	
Monitoring success	General recording (see page 6). A butterfly transect or timed count could be set up as part of the UK Butterfly Monitoring Scheme http://www.ukbms.org. Simple butterfly timed counts can be conducted using the European Butterfly Monitoring app https://butterfly-monitoring.net/ebms-app. Flower-Insect Timed (FIT) counts can be conducted as part of the National Pollinator Monitoring Scheme (PoMS) https://www.ceh.ac.uk/pollinator-monitoring. Conduct Plantlife's 'Every Flower Counts' survey of lawns to survey the number of flowers present and contribute to calculating a National Nectar Score: http://www.plantlife.org.uk/everyflowercounts.	

2

PLANTS: GRASSLAND AND FLOWERS Addition of Yellow-rattle



Sometimes grass grows very quickly. Use Yellow-rattle to reduce its vigour. Yellow-rattle is a native hemi-parasitic plant that reduces grass growth creating more open vegetation allowing a greater diversity of wild plants to grow. Ground needs to be prepared by scarifying.

Suitability	Low to medium density housing if sufficient areas of grassland are available.
Management type	Grassland management.
Supplier information	Find a reputable wildflower seed merchant who can supply UK native seeds, preferably locally-sourced. Consult your local Wildlife Trust for advice on suitable suppliers. Information on how to source wildflower seeds can be found at: http://www.growwilduk.com/where-get-uk-native-wildflower-seeds-plants .
Community engagement?	Yes – potential to involve volunteer residents in sowing Yellow-rattle seed as part of a community engagement exercise.
Benefits	Increasing floral diversity: hemi-parasitic plant that reduces grass growth creating more open vegetation allowing a greater diversity of wild plants to grow.
Costs/Disbenefit	Financial cost: Low.
Level of ongoing maintenance	Medium.



2

PLANTS: GRASSLAND AND FLOWERS

Addition of Yellow-rattle

		Notes
How achieved	Ground preparation: scarify grassland area to expose some bare soil among the vegetation. Then sow Yellow-rattle seed.	
Timing of activity	August-March For best results seeds should be sown no later than November. But they can also be sown in early spring, after putting the seeds in a fridge for a couple of weeks to mimic a winter. For more information see http://www.magnificentmeadows.org.uk/assets/pdfs/Using_yellow_rattle_in_restoration.pdf	
Long-term management	Areas with Yellow-rattle should not be cut until it has gone to seed. This is an annual plant so if cut before produces seed then will lose it altogether. Use material from cut ('green hay') once Yellow-rattle is established to spread to other areas of site where the presence of this plant is desirable. In early years of establishment may require extra seed to be purchased and sown in following autumn depending on success in year 1.	
Monitoring success	General recording (see page 6). A butterfly transect or timed count could be set up as part of the UK Butterfly Monitoring Scheme http://www.ukbms.org, simple butterfly timed counts can be conducted using the European Butterfly Monitoring app https://butterfly-monitoring.net/ebms-app. Flower-Insect Timed (FIT) counts can be conducted as part of the National Pollinator Monitoring Scheme (PoMS) https://www.ceh.ac.uk/pollinator-monitoring. Conduct Plantlife's 'Every Flower Counts' survey of lawns to survey the number of flowers present and contribute to calculating a National Nectar Score: http://www.plantlife.org.uk/everyflowercounts.	

3

PLANTS: GRASSLAND AND FLOWERS Wildflower enhancement



Wildflower seeds and plug plants increase floral diversity at a low cost. Plant plug plants and scatter seeds into spaces in existing grassy areas in April-May after main frosts have finished. This will help create more habitat and increased resources for pollinating invertebrates like bees.

Suitability	Low to medium density housing if sufficient areas of grassland are available.
Management type	Grassland management.
Supplier information	Consult with your local Wildlife Trust for advice on suitable suppliers. Information on how to source wildflower seeds can be found at: http://www.growwilduk.com/where-get-uk-native-wildflower-seeds-plants
Community engagement?	Yes – potential to involve volunteer residents in helping to enhance grassland areas by planting plug plants as part of a community engagement exercise.
Benefits	Greater floral diversity creating more habitat and increased resources for invertebrates and other wildlife such as birds and small mammals.
Costs/Disbenefit	Financial cost: Low-medium depending on number of plants.
Level of ongoing maintenance	Medium.



3

PLANTS: GRASSLAND AND FLOWERS

Wildflower enhancement

		Notes
How achieved	Plant plug plants (and/or scatter wildflower seeds) in designated areas in April-May after main frosts have finished.	
Timing of activity	Plug-planting: April-May after the main frosts have finished. Seed sowing: October/November or February/March.	
Long-term management	Recommend 2-3 mows per year maximum: year 1 mow in March (spring cut), mid-late July (summer cut) and late September to October (autumn cut). Mow the edges of paths more regularly than the rest to help show residents that this is a deliberate activity. Try not to mow all areas at the same time. Leave a few patches of longer vegetation over winter. Where possible, leave the cuttings in place for 1-3 days to give any sheltering wildlife a chance to move away. Don't leave the cuttings for longer than this time as this can increase soil fertility and reduce the diversity of plants that can grow. Where possible cuttings could be moved elsewhere on site, as they can provide food and shelter for other wildlife. Some plant materials such as hollow plant stems can be used in bug hotels and bee nests.	
Monitoring success	General recording (see page 6). A butterfly transect or timed count could be set up as part of the UK Butterfly Monitoring Scheme http://www.ukbms.org. Simple butterfly timed counts can be conducted using the European Butterfly Monitoring app https://butterfly-monitoring.net/ebms-app. Flower-Insect Timed (FIT) counts as part of the National Pollinator Monitoring Scheme (PoMS) https://www.ceh.ac.uk/pollinator-monitoring. Conduct Plantlife's 'Every Flower Counts' survey of lawns to survey the number of flowers present and contribute to calculating a National Nectar Score: http://www.plantlife.org.uk/everyflowercounts.	

4

PLANTS: GRASSLAND AND FLOWERS

Re-seed grassland with native meadow mix



Re-seeding and then, after establishment, reduced mowing. Greater floral diversity creates a greater variety of habitat structure and more resources for invertebrates and other wildlife like birds and mammals. Avoid sowing double-flowered varieties, as these produce little nectar.

Suitability	Low to medium density housing if sufficient areas of grassland are available.
Management type	Grassland management.
Supplier information	Consult your local Wildlife Trust for advice on suitable suppliers. Information on how to source wildflower seeds can be found at: http://www.growwilduk.com/where-get-uk-native-wildflower-seeds-plants .
Community engagement?	Yes – volunteer residents can help re-seed grassland areas as part of a community engagement exercise.
Benefits	• Greater floral diversity creating more habitat and increased resources for invertebrates and generally enhancing biodiversity. • By leaving certain areas to grow longer and support greater floral diversity you will also provide a greater variety of habitat structure which will also increase biodiversity.
Costs/Disbenefit	• Financial cost: Low. • May be a perception of 'untidiness' by residents. Important to clearly communicate to residents the reasons and benefits to wildlife for leaving areas of long grass.
Level of ongoing maintenance	Medium.



4

PLANTS: GRASSLAND AND FLOWERS

Re-seed grassland with meadow mix

		Notes
How achieved	Re-seeding with native wildflower and grass species then after establishment reduced mowing. Avoid double-flowered varieties, as they contain little nectar.	
Timing of activity	Autumn.	
Long-term management	Recommend 2-3 mows per year maximum: year 1 mow in March (spring cut), mid-late July (summer cut) and late September to October (autumn cut). Mow the edges of paths more regularly than the rest to help show residents that this is a deliberate activity. Try not to mow all areas at the same time. Leave a few patches of longer vegetation over winter. Where possible, leave the cuttings in place for 1-3 days to give any sheltering wildlife a chance to move away. Don't leave the cuttings for longer than this time as this can increase soil fertility and reduce the diversity of plants that can grow. Where possible cuttings could be moved elsewhere on site, as they can provide food and shelter for other wildlife. Some plant materials such as hollow plant stems can be used in bug hotels and bee nests.	
Monitoring success	General recording (see page 6). A butterfly transect or timed count could be set up as part of the UK Butterfly Monitoring Scheme http://www.ukbms.org. Simple butterfly timed counts can be conducted using the European Butterfly Monitoring app https://butterfly-monitoring.net/ebms-app. Flower-Insect Timed (FIT) counts can be conducted as part of the National Pollinator Monitoring Scheme (PoMS) https://www.ceh.ac.uk/pollinator-monitoring. Conduct Plantlife's 'Every Flower Counts' survey of lawns to survey the number of flowers present and contribute to calculating a National Nectar Score: http://www.plantlife.org.uk/everyflowercounts.	

5

PLANTS: TREES AND SHRUBS

Plant native wildlife hedge



Hedgerows of native plants provide food, shelter and nesting sites for wildlife. Bare-rooted saplings are cheap, available in bulk, and can be planted in winter. Wildflowers and bulbs can be planted at the base.

Suitability	Low, medium and high density housing if sufficient space for new hedgerow(s).
Management type	Hedgerow management (see also Option 15: Reduced hedge cutting, page 35).
Supplier information	Consult your local Wildlife Trust for advice on suitable suppliers. Potentially could get free trees from the Woodland Trust if qualify: http://www.woodlandtrust.org.uk/plant-trees/schools-and-communities/frequently-asked-questions .
Community engagement?	Yes – potential to involve volunteer residents in helping to plant hedgerow saplings as part of a community engagement event.
Benefits	• Increase in food, shelter, and nesting sites for wildlife. • Screening benefits (noise mitigation, privacy, hiding unsightly objects and views). • Flood attenuation.
Costs/Disbenefit	• Financial cost: Low (depending on length of hedge – approx. between £50 to £100 per 10 m of hedging plants and associated bulb/wildflower mix sowing). • An increase in tree pollen may cause a greater allergies risk to residents. In order to reduce this risk, aim to: » plant a diverse mix of species, » avoid the mass use of male individuals of dioecious species, » choose species with low-moderate pollen production.
Level of ongoing maintenance	Medium.



5

PLANTS: TREES AND SHRUBS

Plant native wildlife hedge

		Notes
How achieved	Clear area of existing vegetation. Plant bare root native trees in a double staggered layer. Plant hedgerow/woodland plants (either plugs or sow appropriate wildflower mix) 1 metre from hedge line. Avoid double-flowered varieties as these often produce very little pollen and nectar.	
Timing of activity	November-March. Avoid planting in very cold or windy weather to reduce the risk of root damage. Never plant in soil that is frozen or waterlogged.	
Long-term management	Regular pruning in years 1-3 to create desired structure and density – recommend spring, summer and autumn/winter cut. Then a single cut every 2-3 years, avoiding the bird nesting season (February-August). Cutting times depend on what you want from the hedge and which of the planted trees are the most successful. Avoid cuts when main flowering species are in flower, e.g. Blackthorn (March-April), Hawthorn (April-May). Light trimming is best once established, rather than heavy cuts. See http://www.hedgelink.org.uk.	
Monitoring success	General recording (see page 6). A butterfly transect or timed count could be set up as part of the UK Butterfly Monitoring Scheme http://www.ukbms.org, simple butterfly timed counts can be conducted using the European Butterfly Monitoring app https://butterfly-monitoring.net/ebms-app. Flower-Insect Timed (FIT) counts can be conducted as part of the National Pollinator Monitoring Scheme (PoMS) https://www.ceh.ac.uk/pollinator-monitoring. Conduct Plantlife's 'Every Flower Counts' survey of lawns to survey the number of flowers present and contribute to calculating a National Nectar Score: http://www.plantlife.org.uk/everyflowercounts. Take part in the 'Great British Hedgerow Survey' run by the People's Trust for Endangered Species (PTES): https://hedgerowsurvey.ptes.org.	

6

PLANTS: TREES AND SHRUBS

Provide vertical planting



Where space is limited, you can increase floral diversity by growing climbing plants. Wildlife-friendly climbers include honeysuckle, jasmine and clematis. They can provide a useful source of nectar for pollinators.

Suitability	Low, medium and high density housing.
Management type	Increasing floral diversity.
Supplier information	- Information from Wildlife Trust on creating vertical gardens: http://www.wildlifetrusts.org/actions/how-create-vertical-garden. - Advice from the Royal Horticultural Society (RHS) on how to create green walls: http://www.rhs.org.uk/advice/profile?PID=547.
Community engagement?	Yes – potential to involve volunteer residents in helping to install planting structures (e.g. trellis), plant shrubs and herbs and/or train existing climbers as part of a community engagement exercise.
Benefits	- Increases overall floral diversity where space may be limited. - Provides important nectar sources and host plants for a wide range of invertebrates. Fruits and seeds provide an important resource for a variety of wildlife. - Structure also provides suitable nesting sites for birds and overwintering habitats for invertebrates.
Costs/Disbenefit	Financial costs: Low (depending on number of plants).
Level of ongoing maintenance	Low.



6

PLANTS: TREES AND SHRUBS

Provide vertical planting

		Notes
How achieved	Fix wires and trellis on any appropriate vertical surface to support wildlife-friendly climbing plants, such as Honeysuckle, Jasmine and Clematis. Avoid double-flowered varieties as these often produce very little pollen and nectar.	
Timing of activity	Any time (except when soil is frozen or waterlogged) although autumn is ideal.	
Long-term management	Train plants to grow over the wire frame and trim annually.	
Monitoring success	General recording (see page 6). Flower-Insect Timed (FIT) counts can be conducted as part of the National Pollinator Monitoring Scheme (PoMS) https://www.ceh.ac.uk/pollinator-monitoring.	

7

PLANTS: TREES AND SHRUBS

Add flowering shrubs and herbaceous plants



Add extra wildlife value to existing gardens by planting flowering shrubs and herbaceous annuals and perennials among the ornamental plants. Useful plants include Mahonia, Flowering Currant and Verbena.

Suitability	Low, medium and high density housing.
Management type	Increasing floral diversity of existing planted areas through additional planting of flowering shrubs and herbaceous plants.
Supplier information	- Consult your local Wildlife Trust for advice on suitable suppliers. - The Royal Horticultural Society (RHS) produces annually-updated lists of plants suitable for pollinators: http://www.rhs.org.uk/science/conservation-biodiversity/wildlife/plants-for-pollinators. - Information on how to source wildflower seeds can be found at: http://www.growwilduk.com/where-get-uk-native-wildflower-seeds-plants.
Community engagement?	Yes – potential to involve volunteer residents in helping to plant shrubs and herbs.
Benefits	- Provide a greater variety of flowering resources throughout the year for pollinating invertebrates. - Provides shelter and nesting habitat for a wide range of wildlife. - Increase in floral diversity and consequent invertebrate diversity with positive knock-on effects to overall biodiversity.
Costs/Disbenefit	Financial cost: Low (depending on number of plants).
Level of ongoing maintenance	High.



7

PLANTS: TREES AND SHRUBS

Add flowering shrubs and herbaceous plants

		Notes
How achieved	Plant shrubs and herbaceous plants known to have flowers attractive to pollinators and that flower at different times of year: in existing spaces among ornamental plants in designated areas. Native species are preferable and include Ivy, Wayfaring Tree, Guelder Rose, Barberry and <i>Daphne mezereum</i>. Some non-invasive ornamental species can be used to augment areas, particularly those that flower at times of year when few native species do, and include: Mahonia, Ceanothus, Lavender, Flowering Currant, and <i>Verbena bonariensis</i> – see the RHS ‘Plants for Pollinators’ lists for suitable plants. Avoid double-flowered varieties as these often produce very little pollen and nectar.	
Timing of activity	Ideal planting times are spring and autumn but follow any species-specific planting advice.	
Long-term management	Annual trimming of plants, preferably following flowering. Plants will require watering during dry periods, particularly container gardens which may need daily watering in hot weather.	
Monitoring success	General recording (see page 6). Invertebrate surveys – a butterfly timed count could be set up as part of the UK Butterfly Monitoring Scheme http://www.ukbms.org. Flower-Insect Timed (FIT) counts can be conducted as part of the National Pollinator Monitoring Scheme (PoMS) https://www.ceh.ac.uk/pollinator-monitoring.	

8

PLANTS: TREES AND SHRUBS

Plant container gardens



Containers are particularly useful if there is limited green space. You could use hanging baskets, window-boxes, tubs and pots. Both native wildflowers and ornamental flowers, shrubs and herbs can be grown.

Suitability	Low, medium and high density housing.
Management type	Increasing floral diversity.
Supplier information	- Consult your local Wildlife Trust for advice on suitable suppliers. - Aim to use native species that are good for attracting invertebrates. Augment with suitable ornamental species where appropriate. The Royal Horticultural Society (RHS) produces annually-updated lists of plants suitable for pollinators: http://www.rhs.org.uk/science/conservation-biodiversity/wildlife/plants-for-pollinators. - Information on how to source wildflower seeds can be found at: http://www.growwilduk.com/where-get-uknative-wildflower-seeds-plants.
Community engagement?	Yes – potential to involve volunteer residents in helping to create their own container gardens and/or plant shrubs and herbs in existing borders, beds and/or containers and window-boxes etc.
Benefits	- Provide flowering resources in areas with limited green space. - Increase in floral diversity and consequent invertebrate diversity with positive knock-on effects to overall biodiversity.
Costs/Disbenefit	Financial cost: Low (depending on number of plants).
Level of ongoing maintenance	Medium or high.



8

PLANTS: TREES AND SHRUBS

Plant container gardens

		Notes
How achieved	To create container gardens, use a mix of hanging baskets, window-boxes, tubs, pots and anything that can be re-purposed, according to the space available. Containers can be sown with native wildflower seed mixes or planted with native plant species and augmented with suitable ornamental plant species. Plant shrubs and herbs in containers in suitable locations. Include species of known value to pollinators – see the RHS ‘Plants for Pollinators’ lists for suitable plants. Avoid double-flowered varieties, as they contain little nectar or pollen.	
Timing of activity	Planting is best in autumn or early spring. Sow seeds in early spring. Trim plants 1-2 times per year, preferably after they have finished flowering. Planting can be throughout the year in containers.	
Long-term management	Annual trimming of shrubby plants, and cutting back herbaceous plants at the end of the season. Dead-heading (removing dead flower heads) can promote extended flowering. But don’t remove all dead flower heads, as they are used by invertebrates. Plants need regular watering, especially during hot and dry weather.	
Monitoring success	General recording (see page 6). Invertebrate surveys – a butterfly timed count could be set up as part of the UK Butterfly Monitoring Scheme http://www.ukbms.org. Flower-Insect Timed (FIT) counts can be conducted as part of the National Pollinator Monitoring Scheme (PoMS) https://www.ceh.ac.uk/pollinator-monitoring.	

9

PLANTS: TREES AND SHRUBS

Plant native trees and shrubs



Plant native tree and shrub species. Replace some non-native conifers and other non-native trees and shrubs with native species where appropriate to do so. This helps to increase overall biodiversity.

Suitability	Low, medium and high density housing if sufficient space is available.
Management type	Tree and shrub management.
Supplier information	- Consult your local Wildlife Trust for advice on suitable suppliers. - Potentially could get free trees from the Woodland Trust http://www.woodlandtrust.org.uk/plant-trees/schools-and-communities/frequently-asked-questions.
Community engagement?	Yes – potential to involve residents in helping to plant tree saplings in suitable locations on site.
Benefits	- Improves botanical diversity and increases invertebrate diversity. - Improves air quality, helps to cool air and reduces ‘urban heat island’ effect. - Flood attenuation. - Conifers are non-native trees with generally low diversity (but some species benefit from conifer planting so not all should be removed). Replacement with deciduous native tree species will increase overall biodiversity.
Costs/Disbenefit	- Financial cost: Low or potentially free (Woodland Trust) - Once mature, trees can cause structural damage to buildings, both at foundation level due to their roots, and through the falling of whole trees or branches. Ensure sufficient space for rootball expansion. - An increase in tree pollen may cause a greater allergies risk to residents – in order to reduce this risk, aim to: » plant a diverse mix of species, » avoid the mass use of male individuals of dioecious species, » choose species with low-moderate pollen production.
Level of ongoing maintenance	Medium.



9

PLANTS: TREES AND SHRUBS

Plant native trees and shrubs

		Notes
How achieved	Planting with native tree species. Avoid double-flowered varieties as these often produce very little pollen and nectar. Gradual and selective removal of conifers (e.g. every other tree) by a qualified tree surgeon and replacement with native tree species.	
Timing of activity	- Planting: between November and March. Avoid planting in very cold or windy weather to reduce the risk of damage to the roots before they become established. Never plant in soil that is frozen or waterlogged. - Removal of conifers: between September and January: Do not cut trees during the bird nesting season (generally February to August).	
Long-term management	- Newly planted trees will require regular watering in dry spells for 3 to 5 years to ensure good root growth. If a guard is used this would need to be removed as soon as they split and before they start to disintegrate (usually after 5-10 years). Check tree ties and stakes to ensure they are secure and ties are not too tight - look for signs of rubbing as this can create a scar, which leaves the tree open to disease. - Removal of conifers should be undertaken over a long period of time. Infill with native tree and shrub species.	
Monitoring success	General recording (see page 6). Flower-Insect Timed (FIT) counts can be conducted as part of the National Pollinator Monitoring Scheme (PoMS) https://www.ceh.ac.uk/pollinator-monitoring.	

10

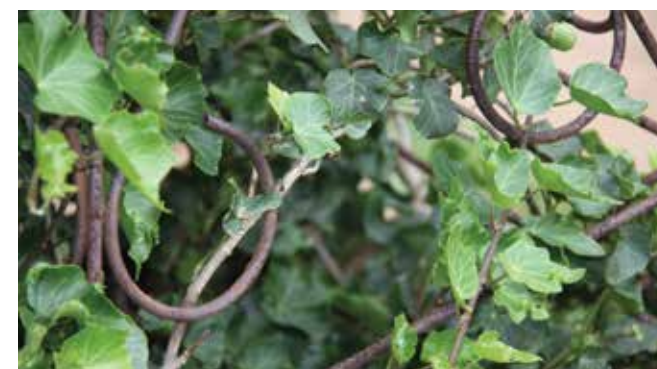
POLLINATORS AND OTHER INVERTEBRATES

Leave or plant ivy as a food resource



Ivy is a useful nectar source at a time of year when other resources are in short supply. The blossom is visited by high numbers of bees, wasps, butterflies, and other important pollinators like hoverflies. Ivy's leaves, berries and structure are also important for a wide variety of wildlife.

Suitability	Low, medium and high density housing (where existing stands of Ivy are present that do not pose H&S concerns).
Management type	Maintaining important resources.
Supplier information	Consult your local Wildlife Trust for advice on suitable suppliers.
Community engagement?	Not really, although important to engage with residents about site management proposals and explain the ecological value of ivy.
Benefits	• An important nectar source at a time of year when other resources are in short supply. Ivy blossom is visited by high numbers of bees, butterflies, and other invertebrates, many of which are important pollinators (e.g. hoverflies). • Ivy is the single most important nectar source for the Ivy Bee, a colonial species of solitary bee that has now become well established in southern England. • The berries and foliage are important food for many animals with some species particularly associated with ivy (e.g. Holly Blue butterfly and numerous moth species). • Ivy stands provide good nesting sites for birds and important overwintering sites for invertebrates, such as the Brimstone butterfly, which spends the winter as adults hidden away from predators. • Ivy is a useful native screening plant being evergreen and provides shelter and cover during winter months.
Costs/Disbenefit	• Financial cost: Low • Ivy can be a H&S issue (e.g. heavy ivy loads on weakened or top-heavy trees can result in tree fall). There is a risk of damage from ivy to high value heritage assets, such as tombstones. You can consider planting the shrub variety <i>Hedera helix</i> 'Arborescens' to avoid any chance of damage.
Level of ongoing maintenance	Medium.



10

POLLINATORS AND OTHER INVERTEBRATES

Leave or plant ivy as a food resource

How achieved	Careful management of ivy already present. Where there are no suitable structures for the climbing variety, we recommend planting the shrub variety <i>Hedera helix</i> 'Arborescens'.	Notes
Timing of activity	Any time.	
Long-term management	Recommend limiting main ivy growth to lower standing structures and structures away from main buildings etc. Could even use purpose-built structures e.g. trellis (ivy screening). Cut back ivy on trees conservatively where total removal is not necessary.	
Monitoring success	General recording (see page 6). Invertebrate surveys – a butterfly timed count could be set up as part of the UK Butterfly Monitoring Scheme http://www.ukbms.org. Flower-Insect Timed (FIT) counts can be conducted as part of the National Pollinator Monitoring Scheme (PoMS) https://www.ceh.ac.uk/pollinator-monitoring.	

11

POLLINATORS AND OTHER INVERTEBRATES

Bug hotels and nest boxes for solitary bees



Install artificial bee nesting boxes and habitats for wildlife to shelter (bug hotels) in suitable locations around the site. These can be bought or home-made using natural materials. Making sure they are secure and well positioned is vital.

Suitability	Low, medium and high density housing.
Management type	Wildlife 'housing'.
Supplier information	- Consult your local Wildlife Trust for advice on suitable suppliers. If purchasing a bug hotel/bee nests, make sure to choose a responsible design. Badly designed artificial nesting sites could negatively impact solitary bee numbers due to parasitism. - Easy to make these by drilling into logs etc. Instructions on how to make a bee hotel: - RSPB: http://www.rspb.org.uk/get-involved/activities/give-nature-a-home-in-your-garden/garden-activities/buildabeebandb. - Wildlife Trust: http://www.wildlifetrusts.org/actions/how-make-bee-hotel.
Community engagement?	Yes - scope for involving residents in building bug hotels and nest boxes, as well as helping to install such features in suitable locations around the site.
Benefits	Increases nesting sites, refuges from predators and overwintering sites for a wide range of invertebrates.
Costs/Disbenefit	Financial cost: Low
Level of ongoing maintenance	Medium.



11

POLLINATORS AND OTHER INVERTEBRATES

Bug hotels and nest boxes for solitary bees

		Notes
How achieved	Purchase and/or build your own bee nesting boxes and bug hotels. Install nest or habitat homes in suitable locations around the site. Make sure they are secure and well positioned (for example avoid south facing where they receive too much direct sunlight). Avoid where possible using single large hotels. Instead use lots of smaller ones spaced around the site.	
Timing of activity	Any time.	
Long-term management	To avoid unnaturally high aggregations of nesting bees we recommend using lots of smaller nest boxes spaced around the site. Nesting boxes, especially larger ones, should include a range of materials with different sized entrance holes to provide suitable nesting sites for a wide range of different sized solitary bee and wasp species. Inspect bee hotels and remove old debris from previously used and unoccupied structures such as hollow tubes (reeds, bamboo etc). Change the nesting blocks or parts every two years. This will help reduce the build up of diseases and parasites. Be careful not to disturb any occupied tubes.	
Monitoring success	General recording (see page 6). Watching bug and bee houses for activity. Submit records with photos to an online recording platform e.g. iNaturalist https://www.inaturalist.org.	

12

POLLINATORS AND OTHER INVERTEBRATES

Create natural nesting sites for invertebrates



Drill holes into existing tree stumps to create nesting sites for bees, wasps and beetles as well as other invertebrates, increasing invertebrate diversity and encouraging wood-feeding invertebrates.

Suitability	Low to medium density housing if suitable habitat is already present on site.
Management type	Natural bee nesting sites.
Supplier information	Not applicable.
Community engagement?	Yes – potential to involve local residents in creating nesting sites, providing the use of hand tools is properly supervised.
Benefits	Creates nesting sites for bees, wasps and beetles as well as other invertebrates, increasing invertebrate diversity and encouraging wood-feeding invertebrates.
Costs/Disbenefit	Financial cost: Low – staff time.



12

POLLINATORS AND OTHER INVERTEBRATES

Create natural nesting sites for invertebrates

		Notes
How achieved	Drill holes into existing tree stumps. Vary hole size and depth to provide suitable nesting sites for the wide range of different sized bees, wasps and other wood-boring invertebrates.	
Timing of activity	Any time.	
Long-term management	None.	
Monitoring success	General recording (see page 6). Watching natural nesting sites for activity. Submit records with photos to an online recording platform e.g. iNaturalist https://www.inaturalist.org.	



Dead wood is useful for wildlife. Log piles and loggeries (sunken logs) provide structural habitat for invertebrates, amphibians, reptiles and mammals and a crucial resource for wood-feeding and wood-boring invertebrates.

Suitability	Low to medium density housing if suitable habitat is already present on site.
Management type	Dead wood management.
Supplier information	Not applicable. Consult with your Local Environmental Records Centre to find out what species occur in your area that could be supported e.g. the rare Stag beetle.
Community engagement?	Yes – potential to involve volunteer residents in helping to create log piles and a loggery in suitable locations on site.
Benefits	- Provides structural habitat for invertebrates, reptiles and mammals and potentially nesting sites for some birds such as wrens and robins. - Provides a crucial resource for wood-feeding and wood-boring invertebrates. - Loggeries are particularly effective for providing suitable resource for the nationally scarce Stag Beetle (if present locally).
Costs/Disbenefit	- Financial cost: Low – staff and volunteer time/expenses. - May be a perception of 'untidiness' by residents. Important to clearly communicate to residents the reasons and benefits to wildlife for creating log piles or loggeries.
Level of ongoing maintenance	Low.



13

POLLINATORS AND OTHER INVERTEBRATES

Create log piles or loggers for invertebrates

		Notes
How achieved	See guidance from People's Trust for Endangered Species (PTES): https://ptes.org/wp-content/uploads/2019/06/Build-a-log-pile-for-stag-beetles.pdf.	
Timing of activity	Any time.	
Long-term management	If undisturbed, little management is needed but it would be valuable to create a new pile every 5 to 10 years to provide continuity of habitat for the deadwood species attracted to the site.	
Monitoring success	General recording (see page 6). Could try 'Bury a Bucket for Beetles' exercise from Peoples Trust for Endangered Species (PTES). https://ptes.org/wp-content/uploads/2018/09/Bury-a-bucket-for-beetles-2018.pdf.	

14

BIRDS AND MAMMALS

Bird nest boxes



Purchase (or self-make) and install boxes and cameras in carefully selected locations on buildings or mature trees. The addition of nest-box cameras will enable residents to observe and appreciate wildlife present.

Suitability	Low, medium and high density housing.
Management type	Wildlife 'housing'.
Supplier information	Consult your local Wildlife Trust for advice on suitable suppliers. We recommend purchasing woodcrete boxes as they are more durable. Consult with your Local Environmental Records Centre to find out what species occur in your area. Wildlife cameras for nest boxes can be purchased from online sellers.
Community engagement?	Yes – good opportunity to involve volunteer residents in helping to install purchased boxes and camera(s). Possible engagement exercise would be to involve residents in a 'build a nest box' activity day(s) and possibly include helping to install boxes around the site.
Benefits	- Increases nesting sites around the site. - The addition of nest-box cameras will enable residents to observe and appreciate wildlife present.
Costs/Disbenefit	Financial cost: Low (depending on number of boxes and cameras).
Level of ongoing maintenance	Low to medium.



14

BIRDS AND MAMMALS

Bird nest boxes

		Notes
How achieved	Purchase and/or self-make and install boxes/camera(s) in carefully selected locations on building(s) or mature trees. Different birds use different types of nest. • Standard nest boxes for species such as Blue tits, Great tits and Starlings. • Open fronted nest boxes for species such as Robins, Wrens and Pied wagtails. • Birds of prey boxes for species such as Tawny owl and Kestrel. • Swift boxes. • House martin nests cups. • Sparrow boxes. Nest boxes should not be positioned south facing, where they will receive too much direct sun. For standard and open fronted nest boxes, consider placing nest boxes at different heights to encourage different species. See http://www.bto.org/sites/default/files/bto-nest-boxes-essential-guide.pdf.	
Timing of activity	Autumn	
Long-term management	Monitor condition. Woodcrete boxes are durable and can last decades, reducing replacement costs compared to wooden boxes, which are liable to rotting and so likely to require replacement more often. Nest boxes should be cleaned out annually between 1 September and 31 January, but always check the nest is unoccupied first. For further guidance see http://www.bto.org/sites/default/files/bto-nest-boxes-essential-guide.pdf.	
Monitoring success	General recording (see page 6). British Trust for Ornithology (BTO) Garden BirdWatch http://www.bto.org/our-science/projects/gbw Monitoring nest cams.	



Reduced cutting to allow hedges to grow wider, denser and taller with some standard trees. This results in an increase in flowers, fruits and nuts which are important resources for pollinators (as well as a wide range of other invertebrates), birds and small mammals. Hedgerows act as important wildlife corridors as well as providing homes for a wide variety of wildlife.

Suitability	Low, medium and high density housing if existing hedgerows are present.
Management type	Hedgerow management.
Community engagement?	Limited scope: important to engage residents with site management proposals and explain why reducing hedgerow cuts will benefit wildlife.
Benefits	- Increases in: » floral resources for pollinators and other invertebrates, » fruits and nuts for birds and small mammals and other wildlife, » nest sites for birds and small mammals, » shelter and refuge for a variety of wildlife. - Reduced management costs.
Costs/Disbenefit	- Financial cost: N/A – cost-saving potential. - May be a perception of ‘untidiness’ by residents. Important to clearly communicate to residents the benefits to wildlife from reducing hedge-cutting.
Level of ongoing maintenance	Low.



15

BIRDS AND MAMMALS

Reduced hedgerow cutting

		Notes
How achieved	Reduced cutting to allow hedgerows to grow wider, denser and taller with some standard trees. Hedgerows are most valuable when at least 1.2 m high and 1 m wide. The aim is to cut in an 'A' shape (see Hedgelink link below for more information).	
Timing of activity	Autumn.	
Long-term management	Recommend a single annual cut every 2-3 years, avoiding the bird nesting season (Feb-Aug inclusive). Recommend managing hedgerows for flowering resources so avoid cuts when main flowering species are in flower, e.g. Blackthorn (March-April), Hawthorn (April-May). Light trimming rather than intensive cuts is recommended. Useful reference for hedgerow management: http://www.hedgelink.org.uk.	
Monitoring success	General recording (see page 6). Invertebrate surveys – a butterfly timed count could be set up as part of the UK Butterfly Monitoring Scheme http://www.ukbms.org. Flower-Insect Timed (FIT) counts can be conducted as part of the National Pollinator Monitoring Scheme (PoMS) https://www.ceh.ac.uk/pollinator-monitoring. Take part in 'The Great British Hedgerow Survey' run by the People's Trust for Endangered Species (PTES): https://hedgerowsurvey.ptes.org.	



Purchase and install boxes in carefully selected locations on building(s) or mature trees.

Suitability	Low, medium and high density housing.
Management type	Wildlife 'housing'.
Supplier information	Consult your local Wildlife Trust for advice on suitable suppliers. Bat Conservation Trust recommend not treating wood. Woodcrete boxes are recommended as they are more durable, provide thermal stability/insulation, and certain designs are self-cleaning. Consult with your Local Environmental Records Centre to find out what species occur in your area.
Community engagement?	Yes – potential to involve volunteer residents in helping to install boxes around site.
Benefits	Increase roosting opportunities for bats around the site.
Costs/Disbenefit	- Financial cost: Low (depending on number of boxes). - Potential negative perception of bats roosting near/on buildings by residents. Ensure residents are informed and any questions/concerns dealt with through public engagement.
Level of ongoing maintenance	Low (depending on box type).



Image credit: The Co-op Group



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BIRDS AND MAMMALS

Bat boxes

		Notes
How achieved	Purchase and install boxes in carefully selected locations on building(s) or mature trees. Position boxes on a range of aspects at a minimum 4 metres. For more information visit: http://www.bats.org.uk/our-work/buildings-planning-and-development/bat-boxes/putting-up-your-box.	
Timing of activity	Any time.	
Long-term management	Monitor condition. Woodcrete boxes are durable and can last decades, reducing replacement costs compared to wooden boxes, which are liable to rotting and so likely to require replacement more often.	
Monitoring success	Bat walks/emergence surveys. Talk with your Local Environmental Records Centre or local Wildlife Trust to learn more about how to monitor bats as this requires specialist equipment.	



Purchase (or self-make) and install habitat homes in carefully selected locations. Modify boundaries to allow hedgehogs to move freely around the site.

Suitability	Low and medium density housing if sufficient space available to install house(s) in suitable locations. Hedgehog highways in low, medium and high density housing.
Management type	Wildlife 'housing'.
Supplier information	Instructions on how to build a hedgehog houses: • Hedgehog Street: http://www.hedgehogstreet.org/wp-content/uploads/2018/06/Hedgehog-Street-Hedgehog-houses-instructions-2018.pdf. • Wildlife Trust: http://www.wildlifetrusts.org/actions/how-build-hedgehog-home. • RSPB: http://www.rspb.org.uk/get-involved/activities/give-nature-a-home-in-your-garden/garden-activities/giveahogahome. • Hedgehog homes can be purchased from online sellers, e.g. the British Hedgehog Preservation Society. Consult with your local Wildlife Trust for advice on suitable suppliers. • Instructions on how to create hedgehog highways: http://www.hedgehogstreet.org/help-hedgehogs/link-your-garden.
Community engagement?	Yes – good opportunity to involve volunteer residents in a 'build a hedgehog house' activity and help to install on site. Could also encourage residents to monitor for signs of use and become involved with Hedgehog Street project; a partnership between People's Trust for Endangered Species (PTES) and the British Hedgehog Preservation Society (BHPS): http://www.hedgehogstreet.org .
Benefits	Provides suitable place for hedgehogs to shelter, breed and hibernate
Costs/Disbenefit	Financial cost: Low or make yourself – evidence suggests hedgehogs are more likely to use homemade houses: https://ptes.org/hedgehog-housing-census-the-results-are-in .
Level of ongoing maintenance	Medium.



17

BIRDS AND MAMMALS

Hedgehog houses and highways

		Notes
How achieved	Purchase and/or self-make and install habitat homes in carefully selected locations. Ensure there are spaces or holes (13 cm x 13 cm) at the base of fences or walls. To create hedgehog highways, remove a brick from the bottom of the wall, cut a small hole in the fence if there are no gaps or dig a channel underneath the wall, fence or gate.	
Timing of activity	Any time, although spring/summer is ideal as ready for hedgehogs house-searching in the autumn.	
Long-term management	Monitor condition of houses and highways. Clear out the hedgehog house once a year (late March - early April) to prevent the build-up of pests. Do not clean it out if a hedgehog is in residence. Check hedgehog highways are kept clear of obstructions (e.g. encroaching vegetation).	
Monitoring success	General recording (see page 6). Look for signs of habitation around house entrance (blocked with vegetation) and general sightings at night, hedgehog droppings etc. Set out footprint tunnels to find out if hedgehogs are present. Instructions can be found on the Hedgehog Street website: http://www.hedgehogstreet.org/about-hedgehogs/tracks-and-signs	



Careful management of scrub already present. Aim to rotationally cut areas to create a diverse habitat structure and carry out management in the autumn/winter, ideally early February, avoiding the bird nesting season.

Suitability	Low to medium density housing.
Management type	Maintaining important resources.
Supplier information	Not applicable.
Community engagement?	Limited scope: scrub clearance events. Important to engage residents with site management proposals and explain why managing areas of scrub will benefit wildlife.
Benefits	- Provides nectar, seeds, fruits, shelter and nest sites for invertebrates, birds and mammals. - Scrub provides a mosaic of habitats and greater structural diversity, which increases biodiversity.
Costs/Disbenefit	- Financial cost: Low. - May be a perception of 'untidiness' by residents. Important to clearly communicate to residents the reasons and benefits to wildlife for leaving areas of scrub habitat.
Level of ongoing maintenance	Low to medium.



18

BIRDS AND MAMMALS

Retain areas of scrub

		Notes
How achieved	Careful management of scrub already present.	
Timing of activity	September-January: Do not cut scrub during the bird nesting season (generally February to August).	
Long-term management	Management of scrub will be required to stop encroachment. Aim to rotationally cut areas to create a diverse habitat structure and carry out management in the autumn/winter, ideally early February, avoiding the bird nesting season (February to August inclusive). Work on fruit-bearing scrub is best delayed until after December, leaving valuable autumn and winter fruits and seeds as food for wildlife. Where scrub is almost entirely composed of bramble, undertake rotational cutting, where 1/5 or 1/6 of the entire scrub patch is cut each year. Over 5-6 years the whole patch will have been cut. This creates a mosaic of bramble at different stages of growth.	
Monitoring success	General recording (see page 6). A butterfly transect or timed count could be set up as part of the UK Butterfly Monitoring Scheme http://www.ukbms.org. Simple butterfly timed counts can be conducted using the European Butterfly Monitoring app https://butterfly-monitoring.net/ebms-app. Flower-Insect Timed (FIT) counts can be conducted as part of the National Pollinator Monitoring Scheme (PoMS) https://www.ceh.ac.uk/pollinator-monitoring. Conduct Plantlife's 'Every Flower Counts' survey of lawns to survey the number of flowers present and contribute to calculating a National Nectar Score: http://www.plantlife.org.uk/everyflowercounts. Checking for the presence of bird nests, small mammals and reptiles, which can all use scrub habitat.	

19

GENERAL BIODIVERSITY

Create pond habitat



Ponds are an oasis for wildlife and can provide important refuges and stepping stones for species through the urban environment. They support a multitude of freshwater plants and animals.

Suitability	Low to medium density housing. Potential for container ponds or mini ponds to be created where space is restricted.
Management type	Pond creation – any size pond is beneficial to site biodiversity.
Supplier information	Lots of advice online for creating a wildlife pond: - Freshwater Habitats Trust's online pond creation toolkit: https://freshwaterhabitats.org.uk/projects/million-ponds/pond-creation-toolkit. - The Wildlife Trust provides instructions for building a garden pond: http://www.wildlifetrusts.org/actions/how-build-pond and also for creating a 'mini' pond – any size will still provide benefits to local wildlife and to residents: http://www.wildlifetrusts.org/actions/how-create-mini-pond.
Community engagement?	Yes – good opportunity to involve volunteer residents in helping to dig a new pond or create a mini-pond using a suitable container.
Benefits	- Ponds support a multitude of freshwater plants and aquatic/semi-aquatic animals. They also provide drinking, feeding and bathing opportunities for a range of terrestrial creatures. - In urban areas they can be an oasis for wildlife and can provide important refuges and stepping stones for species through the urban environment. - Most of the plants and animals that use ponds are highly mobile. If a wildlife-friendly pond is created, it will soon be colonised by a variety of species.
Costs/Disbenefit	- Financial cost: Low-medium (depends on size of pond and quality of liner – butyl rubber recommended for durability). Staff and volunteer time/expenses. - H&S concerns where H&S issues prevent areas of open water, or where space is limited, small container-size ponds provide many biodiversity benefits. Larger ponds can be created within fenced areas or a submerged grid installed.
Level of ongoing maintenance	Medium.



19

GENERAL BIODIVERSITY

Create pond habitat

		Notes
How achieved	Possibly involving volunteer residents to create the pond (if relatively small) and to encourage a sense of ownership by residents, which is key for successful long-term maintenance. If creating a container pond then re-purpose an old tub, sink, plant pot or other water-tight container.	
Timing of activity	Any time.	
Long-term management	As your pond and the plants establish over time, it will need rotational clearance of a proportion of the vegetation and, as it infills with sediment and dead vegetation, some periodic dredging. For a well vegetated, small sunken container-type pond this may happen quite quickly but it is an easy enough task to carry out to maintain it with open water. Bare pond edges are particularly susceptible to colonisation by invasive non-native plant species. Please see http://www.rspb.org.uk/birds-and-wildlife/advice/gardening-for-wildlife/water-for-wildlife/looking-after-your-pond for more information on looking after your pond.	
Monitoring success	General recording (see page 6). If the pond is large enough to pond dip, the Freshwater Trust run 'The Big Pond Dip' survey: https://freshwaterhabitats.org.uk/get-involved-2/big-pond-dip.	



Reducing use of chemical herbicides and pesticides: limiting use only to restricted areas where absolutely required. Use of organic alternatives to pesticides where appropriate.

Suitability	Low, medium and high density housing.
Management type	Reduced use of chemicals.
Supplier information	Not applicable.
Community engagement?	Hand weeding.
Benefits	• Increased biodiversity generally: directly through increase in plants and invertebrates usually killed, and the organisms that feed on them. • Reduction of build-up of harmful chemicals in food chain e.g. hedgehogs which feed on pest invertebrates such as slugs treated with harmful chemicals (e.g. slug pellets). • Reduced hazard to human health of coming into contact with harmful chemicals. • Reduced cost in buying less chemical products, equipment for applying etc., and staff time for application (may be partly offset by time taken for manual removal, especially to begin with).
Costs/Disbenefit	• Some plant species will require manual removal which is likely to take more time than chemical control. • Organic pesticides may be slightly more expensive than synthetic alternatives.
Level of ongoing maintenance	If using organic alternatives, these will be applied as and when required. Manual removal of undesirable plants will be carried out as and when required.



Reduced input of herbicides/pesticides

		Notes
How achieved	Reducing use of chemical herbicides and pesticides: limiting use only to restricted areas where absolutely required. Use of organic alternatives to pesticides where appropriate.	
Timing of activity	Any time.	
Long-term management	Continued reduction of chemical inputs. Over time the increase in beneficial invertebrates through reduced chemical pesticides should promote natural pest and weed control and therefore any use of chemical and/or organic herbicides and pesticides should be relaxed further over time.	
Monitoring success	General recording (see page 6). A butterfly transect or timed count could be set up as part of the UK Butterfly Monitoring Scheme http://www.ukbms.org . Simple butterfly timed counts can be conducted using the European Butterfly Monitoring app https://butterfly-monitoring.net/ebms-app . Flower-Insect Timed (FIT) counts can be conducted as part of the National Pollinator Monitoring Scheme (PoMS) https://www.ceh.ac.uk/pollinator-monitoring . Conduct Plantlife's 'Every Flower Counts' survey of lawns to survey the number of flowers present and contribute to calculating a National Nectar Score: http://www.plantlife.org.uk/everyflowercounts .	



A green roof is a thin soil layer covered with mosses, succulents and herbs. Other options include a biosolar roof and a living wall system. Installation requires the use of specialist contractors.

Suitability	Low, medium and high density housing.
Management type	Increase site biodiversity and sustainability.
Supplier information	Many different commercial companies offer products/services to design and build green roofs/living wall systems. Livingroofs.org is an independent organisation to promote green roofs and living walls in urban areas in the UK and around the world. They offer advice and information https://livingroofs.org .
Community engagement?	No – requires specialist contractor.
Benefits	• Increase habitat and promote biodiversity by attracting wildlife. • Flood attenuation and improved water quality. • Temperature regulation: reduces heat loss in winter and keeps building cooler in summer. Also helps to cool air and reduce the 'urban heat island' effect. • Improves sound absorption in the top floors of buildings. • Improves air quality. • Reduced energy consumption, helping to reduce energy bills. • Lifespan of the roof is significantly extended due to protection from weathering (e.g. UV rays).
Costs/Disbenefit	• Financial cost: High. • Installation and ongoing specialist maintenance costs. • Access to roof/upper sections of walls for ongoing maintenance. • Any leaks are harder to trace and fix.
Level of ongoing maintenance	Medium to high: depends on the type of green roof/living wall system installed.



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GENERAL BIODIVERSITY

Green roofs and living walls

		Notes
How achieved	Install 'extensive' green / brown roofs (i.e. thin soil layer covered with mosses, succulents and herbs so lightweight and requires minimal maintenance), biosolar roof and/or living wall system. Specialist contractor required to design and install green/ brown roof, living wall or biosolar (solar panels) roof correctly and provide an aftercare service.	
Timing of activity	Any time	
Long-term management	Green roofs require limited maintenance, but may require supplementary watering. The timing of supplementary watering depends on the type of roof and weather. Your contractor will be able to advise you on this. Twice yearly maintenance visits by a specialist contractor to clear gutters and drainage channels and cut or remove season's growth (biodiverse roofs) and clear any invasive species. Intensive green roofs will have greater maintenance requirements. Living wall systems require regular maintenance, which is likely to require input from a specialist contractor, depending on the type of living wall installed. The level of maintenance for biosolar roofs will depend on whether the solar panels are integrated into extensive or intensive green roof systems.	
Monitoring success	Flower-Insect Timed (FIT) counts can be conducted as part of the National Pollinator Monitoring Scheme (PoMS) https://www.ceh.ac.uk/pollinator-monitoring .	



Compost bins provide somewhere to dispose of grass cuttings and other green waste without sending to landfill. An ideal compost heap contains a mix of material: grass cuttings, coarse grass, dead leaves and cardboard. It should be turned at least once or twice a year.

Suitability	Low to medium density housing (compost heap) and high density housing (compost bins).
Management type	Green waste recycling. This option would work well as a companion activity with 'create vegetable plots' and 'flowering shrubs and containers'.
Supplier information	Could purchase compost bin(s) from local council (in partnership with Straight Manufacturing Ltd). Alternatively, build a compost heap as part of community engagement activity e.g. through Garden Organic: http://www.gardenorganic.org.uk.
Community engagement?	Yes – mainly for volunteer residents of low/medium density housing – could help build a compost heap.
Benefits	- Provides somewhere to dispose of grass cuttings and other green waste without sending to landfill. - Offers additional shelter, foraging and hibernation habitat for a range of species including invertebrates, small mammals and reptiles. - Provides free compost to use on site to increase the organic content in the soil and can also be used as mulch to retain soil moisture and reduce the amount of artificial fertiliser needed.
Costs/Disbenefit	Financial cost: Low – staff and volunteer time/expenses.
Level of ongoing maintenance	High.



22

SUSTAINABILITY

Build and install compost bins

		Notes
How achieved	Install compost bins in a suitable area. Building two bays to the compost bin allows one bay to be actively filled over the growing season whilst the other bay is left to compost. An ideal compost heap contains a mix of material: grass cuttings, coarse grass, dead leaves and cardboard. It should be turned at least once or twice a year and can produce compost fairly quickly.	
Timing of activity	Any time.	
Long-term management	In the autumn, empty the composted side. Use or give to volunteers. Put any material which has not composted into the second bay and start to fill the now empty first bay with grass cuttings.	



Suitable raised beds and containers can be purchased or built by volunteer groups with appropriate guidance, materials and expert supervision. Substrate and vegetable and fruit plants can be purchased from numerous vendors or can be grown from seed by residents.

Suitability	Low to medium density housing.
Management type	Food growing. This option would work well as a companion activity with 'install a water butt' and 'build/install compost bins'.
Supplier information	Useful online advice/resources from : - Garden Organic: http://www.gardenorganic.org.uk. - Social Farms & Gardens (free membership): http://www.farmgarden.org.uk.
Community engagement?	Yes – good opportunity to create a resident gardening group and establish a community food-growing project. Potential to collaborate with other partners e.g. Garden Organic, Social Farms & Gardens.
Benefits	- Provides fresh, organic, nutritional and low-cost food to residents, improving health and well-being. - Opportunities to create community gardening group with associated social benefits (e.g. increases community cohesion and promotes sense of ownership by residents). - Organic vegetable and fruit plants are very good for biodiversity as well. Fruit bushes for example are key to the survival of a few very rare moth species that have declined by over 90% in the last 40 yrs because of reduced growing of fruit plants and increased use of pesticides.
Costs/Disbenefit	Financial cost: Low.
Level of ongoing maintenance	High.



23

SUSTAINABILITY

Create vegetable plots

		Notes
How achieved	Suitable raised beds and containers can be purchased or built by volunteer groups with appropriate guidance, materials and expert supervision. Suitable sites for these structures should be identified. Substrate and vegetable and fruit plants can be purchased from numerous vendors or can be grown from seed by residents.	
Timing of activity	Any time.	
Long-term management	Fruit trees and bushes should be pruned annually as appropriate, fruit and vegetables harvested and annual vegetable plants re-sown as appropriate depending on what is grown and how regularly produce is harvested. Such areas should not be left to get overgrown and regular watering may be required.	

24 SUSTAINABILITY

Install a water butt



A water butt is used to capture rainfall, which can then be used for watering plants. It helps reduce tapwater consumption, which may become significant if hosepipes are used. Harvested rainwater is also better for flowers, fruit and vegetables.

Suitability	Low, medium and high density housing.
Management type	Water-saving. This option would work well as a companion activity with 'create vegetable plots' and 'flowering shrubs and containers'.
Supplier information	Many water companies and local councils offer water butt products via partnership with Straight Manufacturing Ltd.
Community engagement?	Inform residents that free and sustainable water source available to use for watering garden beds, containers etc.
Benefits	• Reduces tap water consumption. • Harvested rainwater is much better for plants, flowers, fruit and vegetables than tap water, which is often treated with chemicals and chlorine.
Costs/Disbenefit	Financial cost: Low – staff time to install.
Level of ongoing maintenance	Low.



24

SUSTAINABILITY

Install a water butt

		Notes
How achieved	Purchase and install water butt(s) in suitable locations.	
Timing of activity	Any time.	
Long-term management	Clean out water butts annually in winter to prevent plant diseases spreading.	



A rain garden is a type of sustainable drainage system. It is made by creating a shallow depression with absorbent, yet free draining soil. Choose plants that can withstand occasional temporary flooding. Or you can use window boxes and containers, watered with downpipes.

Suitability	Low, medium and high density housing.
Management type	Sustainable Drainage System. Rain gardens are shallow planted basins that allow water to drain naturally into the soil (or planted container fed by rainwater from a downpipe).
Supplier information	Useful information for creating rain gardens can be found in the UK Rain Garden Guide, download for free at: https://raingardens.info .
Community engagement?	Can involve volunteer residents in helping to plant up containers or rain gardens that have been dug into existing beds/paved/lawn areas.
Benefits	• Flood attenuation and improved water quality. • Increase in plant and invertebrate diversity with positive knock-on effects to overall biodiversity. • Reduced maintenance costs where rain gardens replace areas of frequently mown lawn.
Costs/Disbenefit	Financial cost: Low to medium (depending on type of feature installed) – staff and volunteer time and expenses.
Level of ongoing maintenance	Low.



25

SUSTAINABILITY

Create rain gardens

		Notes
How achieved	Various features can be installed: • Planters, window boxes or containers that can be fed using rainwater from downpipes. • A rain garden, made by creating a shallow depression with absorbent, yet free draining soil and planted with suitable plant species that can withstand occasional temporary flooding. See the 'UK Rain Garden Guide' for specific guidance: https://raingardens.info/wp-content/uploads/2012/07/UKRainGarden-Guide.pdf.	
Timing of activity	Any time.	
Long-term management	Minimal – occasional weeding as part of general site management and annual trimming of vegetation.	

26 SUSTAINABILITY

Sustainable lighting



Artificial light in gardens disrupts natural behaviour for some wildlife, so it is important to retain some dark areas. Modify existing light fittings with shields, baffles, louvres or motion sensors to reduce light spill. There is a potential for cost saving through reduced electricity use.

Suitability	Low, medium and high density housing.
Management type	Sustainable lighting – modify existing light fittings with shields / baffles / louvres / motion sensors etc. to reduce light pollution.
Supplier information	Various suppliers available. The Institution for Lighting Professionals (ILP) has produced useful guidance for the reduction of obtrusive light: http://theilp.org.uk/publication/guidance-note-1-for-the-reduction-of-obtrusive-light-2020 .
Community engagement?	No – light modifications should be carried out by a professional technician.
Benefits	• Reduces negative impacts on wildlife: Artificial light in gardens disrupts natural behaviour for some wildlife (e.g. feeding, breeding cycles) so it is important to retain some dark areas. Garden birds are disturbed from sleep by sudden lighting and can begin singing before dawn, wasting energy, with the potential knock-on effect of disrupting residents' sleep. • Reduces light pollution for humans, which can cause disruption to sleep patterns. • Reduced energy costs.
Costs/Disbenefit	• Financial cost: Low to medium (depending on number of lights and type of modification). Cost-saving potential in the long-term. • Security concerns may be an issue so lighting improvement plans should be discussed and agreed with residents beforehand.
Level of ongoing maintenance	Low.



26

SUSTAINABILITY

Sustainable lighting

		Notes
How achieved	• Fit the correct light for the required task. • Use the minimum level of brightness and avoid white/blue 'daylight' colour LED bulbs (5000-6000 Kelvin range) as this has negative effects on wildlife; opt for 'warm white' colour range LED bulbs (2700-3000 Kelvin range). • Install and adjust all lights correctly to minimise light spill. • Operate lights for the minimum required time (e.g. by fitting motion sensors and/or timers).	
Timing of activity	Any time.	
Long-term management	Minimal – check condition of lights, shields, motion sensors etc. and that all are functioning correctly.	